Nine-Mile Lake

Site Description

Location

Water designation number (WDN)	48-0025-00
Legal description	T126N-R55W-Sec. 5; T127N-R55W-Sec. 31, 32
County (ies)	Marshall
Location from nearest town	3 north and 3.5 miles west of Lake City, SD.

Survey Dates and Sampling Information

Survey dates	May 30-31, 2012 (FN,GN)
Frame net sets (n)	12
Gill net sets (n)	3

Morphometry (Figure 1)

Watershed area (acres)	2,592
Surface area (acres)	282
Maximum depth (ft)	10
Mean depth (ft)	7

Ownership and Public Access

Nine-Mile Lake is a meandered lake owned by the State of South Dakota and the fishery is managed by the SDGFP. A public access (including boat ramp) is located on the northeast portion of Nine-Mile Lake and is maintained by the SDGFP (Figure 1). Property adjacent to Nine-Mile Lake is owned by the State of South Dakota and private individuals. Several homes and cabins are located along the north-northwestern shoreline of Nine-Mile Lake.

Watershed and Land Use

Nine-Mile Lake is located within the 34,744 acre Roy Lake sub-watershed (HUC-12). Land use within the watershed is primarily agricultural including a mix of pasture or grassland, cropland, and scattered shelterbelts.

Water Level Observations

The South Dakota Water Management Board established OHWM is 1825.5 fmsl and the outlet elevation is 1824.9 fmsl. On May 16, 2012 the elevation of Nine-Mile Lake was 1826.7, which indicated an increase from the fall 2011 elevation of 1824.4 fmsl. The water level had declined to an elevation of 1823.3 fmsl on September 27, 2012

Fish Management Information

Primary species	Northern Pike, Yellow Perch
Other species	Black Bullhead, Bluegill, Walleye, White Sucker
Lake-specific regulations	none
Management classification	warm-water semi-permanent
Fish consumption advisories	none

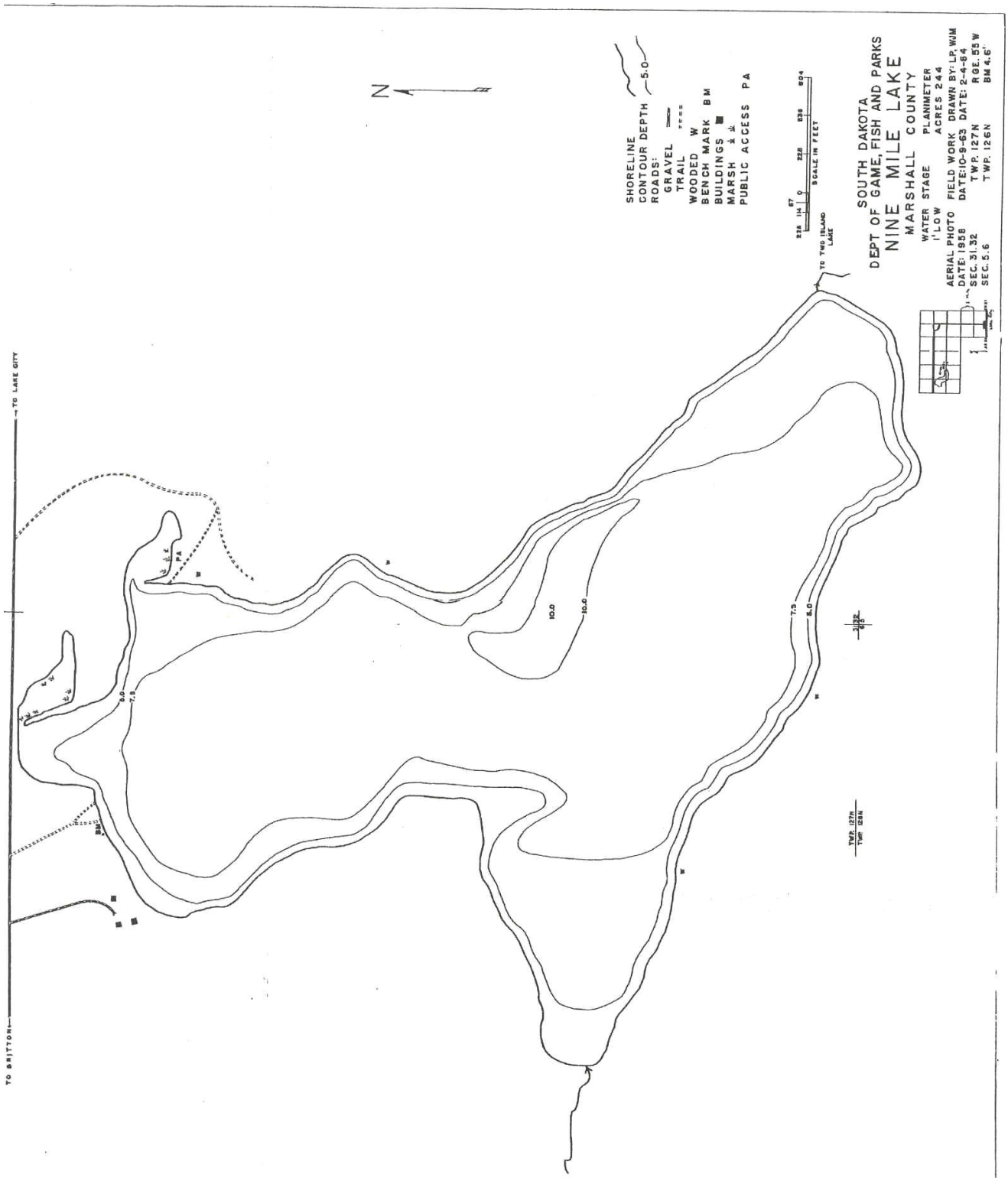

Figure 1. Map depicting depth contours of Nine-Mille Lake, Marshall County, South Dakota.

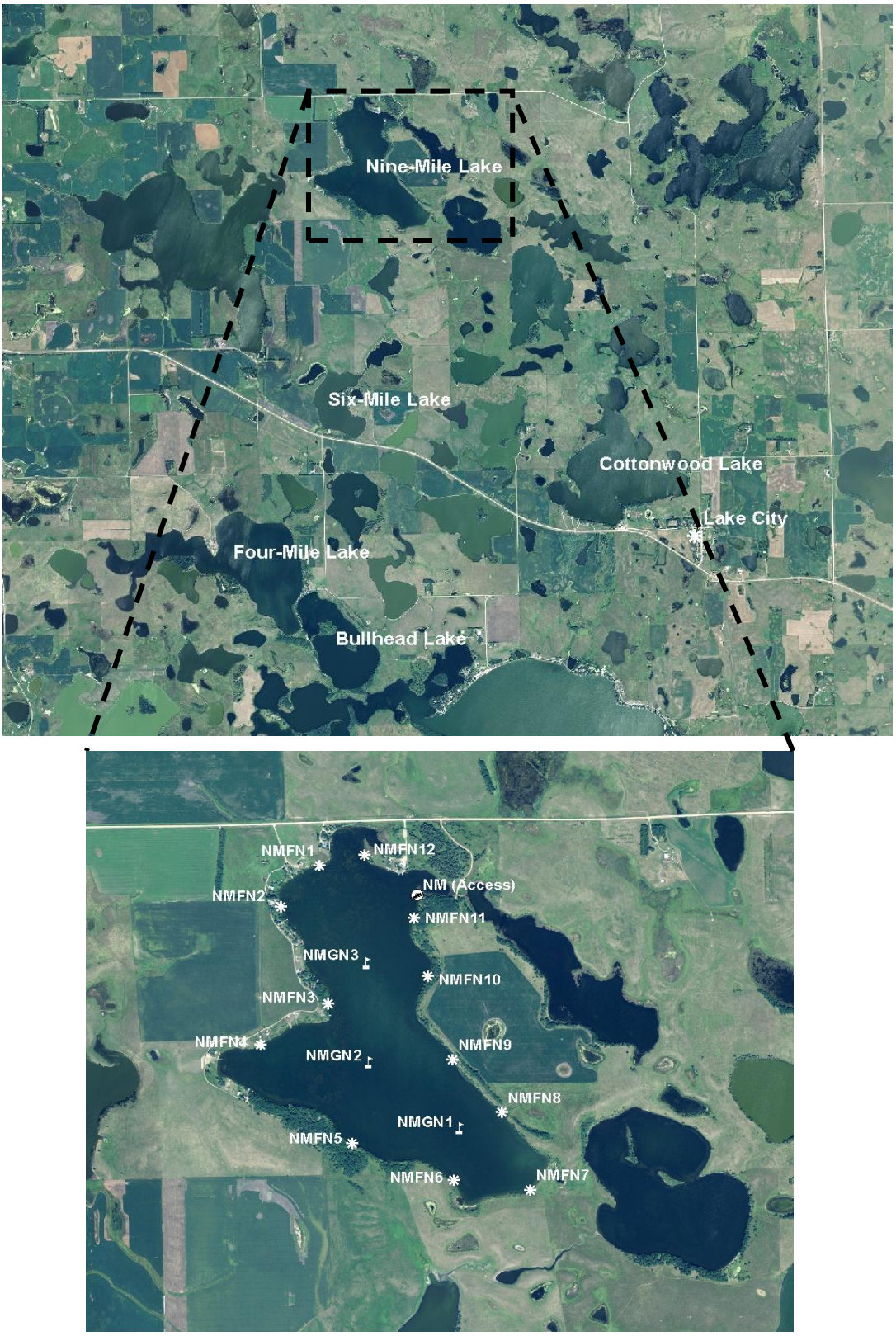

Figure 2. Map depicting geographic locations of several, Marshall County, lakes from Lake City, South Dakota (top). Also noted are access and standardized net locations for Nine-Mile Lake (bottom). NMFN= frame net; NMGN= gill net

Management Objectives

1) Maintain a mean gill net CPUE of stock-length Northern Pike ≥ 3, a PSD of 30-60, and a PSD-P of 5-10.

2) Maintain a mean gill net CPUE of stock-length Yellow Perch ≥ 30, a PSD of 30-60, and a PSD-P of 5-10.

3) Maintain a mean frame net CPUE of stock-length Black Bullhead ≤ 100.

Results and Discussion

Nine-Mile Lake is a shallow natural lake, with abundant submerged vegetation. Dating back to the late-1960's the fish community has been comprised mainly of more winterkill tolerant species such as Black Bullhead, Northern Pike, and Yellow Perch; however, occasional short-lived intervals of relatively-high Walleye abundance have occurred between winterkill events. Currently, Nine-Mile Lake is managed as a Northern Pike and Yellow Perch fishery.

Primary Species

Yellow Perch: The mean gill net CPUE of stock-length Yellow Perch in 2012 was 32.3 (Table 1) and above the minimum objective (≥ 30 stock-length Yellow Perch/net night; Table 3). Yellow Perch relative abundance is considered high.

In 2012, gill net captured Yellow Perch ranged in TL from 8 to 18 cm (3.1 to 7.1 in; Figure 4). Based on otolith age estimates, three year classes (2007, 2009, and 2011) were represented in the gill net sample (Table 7).

Yellow Perch growth appeared to be slow with a weighted mean TL at capture of age 3 male and female Yellow Perch of 143 and 150 mm (5.6 and 5.9 in.; Table 8), respectively. The mean Wr of stock-length Yellow Perch was 98 (Table 1).

Northern Pike: In 2012, Northern Pike relative abundance was high with a mean gill net CPUE of 7.3 (Table 1) and above the management objective (≥3 stock-length Northern Pike/net night; Table 3). Northern Pike ranged in TL from 34 to 77 cm (13.4 to 30.3 in.; Figure 3) had a PSD of 41 and PSD-P of 9 (Table 1). Both PSD and PSD-P were within management objective ranges (30-60 and 5-10, respectively; Table 3) indicating a balanced population. Condition was good with mean Wr values ranging from 86 to 117 for all length categories sampled. The mean Wr of stock-length Northern Pike was 96 (Table 1). An increasing trend in Wr was observed as TL increased.

Other Species

Black Bullhead: Black Bullheads were the most abundant species in the 2012 frame net catch (Table 1). The mean frame net CPUE for stock-length Black Bullhead was 91.6 (Table 1). Based on the 2012 frame net catch, relative abundance of Black Bullhead appears to be high.

Black Bullheads captured in the 2012 frame net catch ranged in TL from 8 to 37 cm (3.1 to 14.6 in), had a PSD of 2, and a PSD-P of 1 (Table 1, Figure 5). No growth information was collected in 2012. The mean Wr of stock-length Black Bullheads was 103 (Table 1).

Walleye: The shallow nature and susceptibility of Nine Mile Lake to winterkill exclude Walleye from being a primary management species. However, occasionally excess Walleye are available and stocked to provide additional angling opportunities (Table 6). Few Walleye were captured during the 2012 survey (Table 1).

Other: White Sucker was the only other fish species captured during the 2012 survey (Table 1).

Management Recommendations

1) Conduct fish community assessment surveys on an every fifth year basiss (next survey scheduled for the summer of 2017) to monitor fish relative abundance, fish population size structures, fish growth, and stocking success.

2) Continue to manage as a self-sustaining northern pike and yellow perch fishery.

3) Stock walleye (≈500 fry/acre) provided water levels are favorable (i.e., lake is full), excess walleye are available, and other higher priority stockings have been completed.

4) Collect otoliths from Walleye and Yellow Perch to assess age structure and growth rates of each population.

5) Monitor water levels and winterkill events. In cases of substantial winterkill re-stock with Northern Pike and Yellow Perch to establish a fish community.

Table 1. Mean catch rate (CPUE; catch/net night) of stock-length fish, proportional size distribution of quality- (PSD) and preferred-length fish (PSD-P), and mean relative weight (Wr) of stock-length fish for various fish species captured in experimental gill nets from Nine Mile Lake, 2012. Confidence intervals include 80 percent (± CI-80) or 90 percent (± CI-90). BLB= Black Bullhead; NOP= Northern Pike; WAE= Walleye; WHS= White Sucker; YEP= Yellow Perch

	Abundance		Stock Density Indices				Condition	
Species	CPUE	CI-80	PSD	CI-90	PSD-P	CI-90	Wr	CI-90
Frame Nets								
BLB	91.6	30.3	2	1	1	1	103	2
NOP	0.7	0.3	75	31	0	---	95	7
WAE	0.3	0.3	100	0	75	59	95	9
WHS	0.1	0.1	100	---	100	---	125	---
YEP	44.9	19.2	1	1	0	---	98	1
Gill Nets								
BLB	29.7	26.8	6	4	0	---	108	1
NOP	7.3	2.3	41	18	9	11	96	3
WHS	1.7	0.6	100	0	100	0	113	17
YEP	32.3	1.3	0	---	0	---	98	<1

Table 2. Historic mean catch rate (CPUE; catch/net night) of stock-length fish for various fish species captured in frame nets and experimental gill nets from Nine-Mile Lake, 2007-2012. BLB= Black Bullhead; BLG= Bluegill; NOP= Northern Pike; WAE= Walleye; WHS= White Sucker; YEP= Yellow Perch

	CPUE					
Species	2007	2008	2009	2010	2011	2012
Frame nets						
BLB	10.4	---	---	---	---	91.6
BLG	0.1	---	---	---	---	0.0
NOP	0.3	---	---	---	---	0.7
WAE	0.7					0.3
WHS	0.0	---	---	---	---	0.1
YEP	40.0	---	---	---	---	44.9
Gill nets						
BLB	3.7	---	---	---	---	29.7
NOP	10.0	---	---	---	---	7.3
WAE	0.3	---	---	---	---	0.0
WHS	0.0	---	---	---	---	1.7
YEP	18.0	---	---	---	---	32.3

Table 3. Mean catch rate (CPUE; catch/net night) of stock-length fish, proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish, and mean relative weight (Wr) for selected species captured in frame nets and experimental gill nets from Nine-Mile Lake, 2007-2012. BLB= Black Bullhead; NOP= Northern Pike; YEP = Yellow Perch

Species	2007	2008	2009	2010	2011	2012	Objective
Frame nets							
BLB							
CPUE	10	---	---	---	---	92	≤ 100
PSD	97	---	---	---	---	2	---
PSD-P	3	---	---	---	---	1	---
Wr	107	---	---	---	---	103	---
Gill nets							
NOP							
CPUE	10	---	---	---	---	7	≥ 3
PSD	43	---	---	---	---	41	30-60
PSD-P	0	---	---	---	---	9	5-10
Wr	100	---	---	---	---	96	---
YEP							
CPUE	18	---	---	---	---	32	≥ 30
PSD	0	---	---	---	---	0	30-60
PSD-P	0	---	---	---	---	0	5-10
Wr	97	---	---	---	---	98	---

Table 4. Year class distribution based on the expanded age/length summary for Yellow Perch sampled in gill nets from Nine-Mile Lake, 2012.

	Year Class					
Survey Year	2012	2011	2010	2009	2008	2007
2012		14		96		1

Table 5. Weighted mean TL (mm) at capture by gender for Yellow Perch captured in experimental gill nets (expanded sample size) from Nine-Mile Lake, 2012.

	Age				
Year	1	2	3	4	5
2012					
Male	90 (6)	---	143 (25)	---	188 (1)
Female	92 (8)	---	150 (71)	---	---
Combined	91 (14)	---	147 (96)	---	188 (1)

Table 6. Stocking history including size and number for fishes stocked into Nine-Mile Lake, 2003-2012. LMB= Largemouth Bass; WAE= Walleye

Year	Species	Size	Number
2003	WAE	small fingerling	26,700
2004	WAE	fry	260,000
2005	LMB	fingerling	25,600
	WAE	large fingerling	2,720
2010	WAE	fry	260,000
2012	WAE	fry	260,000

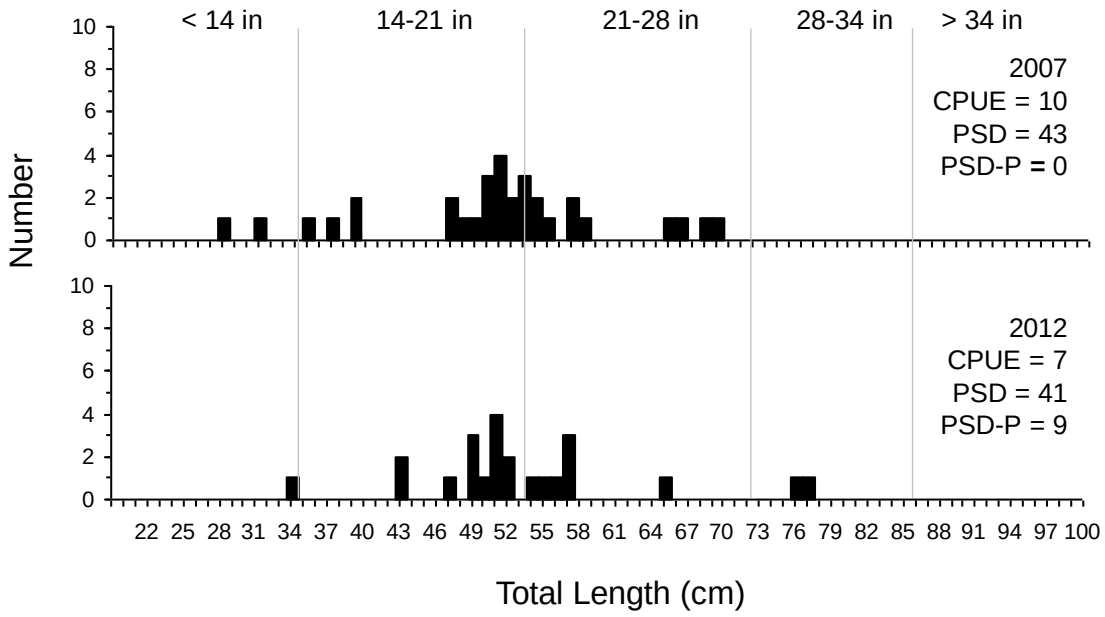

Figure 3. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for Northern Pike captured using experimental gill nets in Nine-Mile Lake, 2007 and 2012.

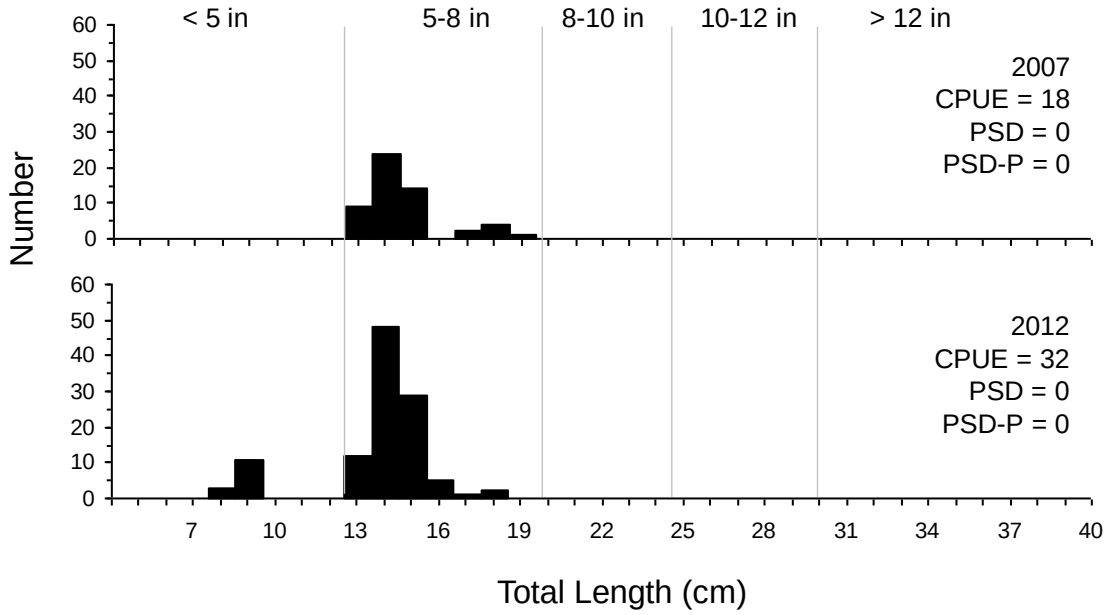

Figure 4. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for Yellow Perch captured using experimental gill nets in Nine-Mile Lake, 2007 and 2012.

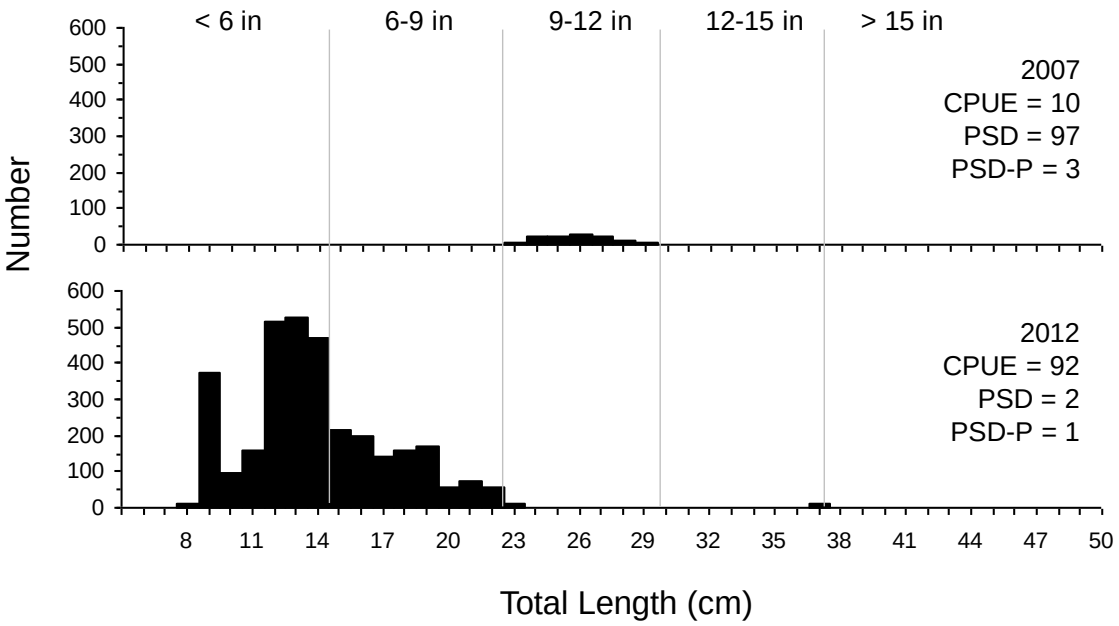

Figure 5. Length-frequency histogram, catch rate of stock-length fish (CPUE), proportional size distribution of quality- (PSD) and preferred-length (PSD-P) fish for Black Bullhead captured using frame nets in Nine-Mile Lake, 2007 and 2012.